

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1876.—VOL. XLI.

LONDON, SATURDAY, AUGUST 5, 1871.

{PRICE FIVEPENCE.
PER ANNUM, BY POST, £1 4s.

Original Correspondence.

BIRMINGHAM, AND THE BLACK COUNTRY.

THE INTENDED VISIT OF THE IRON AND STEEL INSTITUTE TO STAFFORDSHIRE.

The Conegre Blast-Furnaces are situated on the other side of Tipton from the Bloomfield Ironworks, and are the property of the Earl of Dudley. There are three furnaces similar in construction to those at the Level, and the raw material is conveyed to the tops upon an incline, by means of a high pressure vertical engine, having attached to its drum a flat chain running over pulleys. Mr. E. F. Smith has here studied to save expense and labour, and almost every known appliance having that object in reference to blast-furnaces is in operation. The gas is taken off from the furnace tops upon Addenbrook's plan, and heats the whole of the boilers about the works, and also the hot-air ovens. The waste gas is conveyed from the furnace tops to the boilers and ovens, through wrought-iron tubes lined with white bricks, and what remains after combustion has taken place passes through brick flues to a large stack, 180 ft. high by 10 ft. 6 in. square throughout. The cinder is taken from the furnaces up an incline, at the top of which there is a small horizontal engine. There are two condensing beam engines employed for producing the blast, having cylinders 36 in. diameter, blowing tubs 72 in. diameter, and each a stroke of 8 ft. The two engines are connected by means of cranks placed upon one common fly-wheel shaft, and the blowing cylinders are under the steam cylinders, at the opposite end of the beams, from the fly-wheel. The engines work expansively, and are placed entirely inside a large engine-house, and being nicely finished they look exceedingly well. Steam is generated in several cylindrical egg-ended boilers, 33 ft. long by 6 ft. 6 in. diameter. The blast is heated in hot-air ovens, fitted, most of them, with syphon pipes, but one has round twin pipes. The ironstone before going into the furnaces is calcined in two large brick kilns, cased with wrought-iron, and a considerable amount of both labour and fuel is saved by this means. The raw stone and slack is drawn up an incline by a small horizontal engine to the tops of the kilns in the same wagons in which it comes from the pits, and is thrown straight into the kilns, one man being sufficient on the top to attend to both the stone and the fuel. By the old plan of calcining in open heaps a great deal of labour was required, as the material had to be emptied out of the wagon, loaded into a barrow, wheeled on to the heap, and properly distributed. By this method large quantities of coal and slack are required to burn the stone, whilst in the kilns 3 tons of slack are found sufficient for 100 tons of raw stone. The bottoms of the kilns are so arranged at Conegre that the material when calcined rolls down to a sort of hopper, from which it is filled into barrows. The door of the hopper is lowered, the mine shoots out into the barrow, and fills it, upon which the door is immediately shut. Screens are made to slope from the side of the incline going to the tops of the kilns, and the tipping wagons filled with coal are drawn by the engine up to the tops of the screens, and their contents are precipitated down them, by which means the lumps are deposited in large hoppers at the bottom, and the small goes through the screens into other similar receptacles. The whole of the hoppers are fitted with apparatus for filling the barrows. Near the front of the blast-furnaces there are two large foundries, in which nearly the whole of the castings used at Round Oak and the other portions of the estate, are made. The iron is melted in two cupolas and a large air-furnace, and the foundries are furnished with the necessary core-drying stoves and large cranes. Near the end of the larger foundry there is a drier, in which a portion of the produce of the furnaces is refined for the use of the ironworks. The Conegre furnaces stand in the midst of extensive collieries, so that the raw material, such as mine and fuel, has not to be conveyed far. There is a small plant for making the gas used about the furnaces, and there is a very commodious range of offices near the outskirts of the yard.

The works of the New British Iron Company, of which we gave a full description in the Supplements to the *Mining Journal* of Feb. 4 and 11, are situated near the village of Cradley, about 3½ miles from Dudley, and not far from Birmingham. At Congreaves there are the extensive ironworks and blast-furnaces, and several collieries surrounding them. The works were founded by a working nailer named Attwood, and after his death carried on by his son, John Attwood. Both were very successful, and the works and collieries extended till they reached considerable proportions; and in the year 1842 negotiations were entered into with the British Iron Company for their sale. The amount asked was over 500,000£, and the company, who owned large works in Wales, sent their agents to examine the books and inspect the works, and from their representation the negotiations were concluded, and the company took possession. After some little time the purchasers refused to pay the sum agreed upon, alleging that they had treated for property that really had no existence, and that Attwood had made false returns. Proceedings were taken against the latter, and then commenced a most remarkable law case, for it was heard twice at the Stafford Assizes, went through the whole of the Superior Courts, and was ultimately settled in the House of Lords in favour of Attwood. It was twice in the Court of Chancery, before Lord Brougham and Lord Lyndhurst, who each gave adverse decisions. This extensive litigation ruined the British Iron Company, but, Phoenix-like, out of the ashes arose, in 1844, the present New British Iron Company. The latter company have remodelled the works so that they are as complete as almost any in South Staffordshire. The enterprising general manager is Mr. J. P. Hunt, who is this year Chairman of the South Staffordshire Iron Trade. The brand of the company is the lion, and all iron bearing this is known to be good, and needs no recommendation from us.

To commence with a description of the blast-furnaces, the furnace yard is one of the best arranged in the district; it covers a large area, and is, therefore, not confined or cramped for space. The coke used is all burnt in the yard from coal got on the estate, and is piled in large heaps around six brick chimneys, of which there are 150. The native white and gubbin ironstones are the produce of the estate, and are calcined in the yard, and afterwards used in the furnaces with the North of England red, and the North Staffordshire brown hematite. There are six blast-furnaces, all built of brickwork, bound with wrought-iron hoops. Four stand together, and are 46 ft. high by 15 ft. diameter in the boshes, and the other two are 43 ft. high by 17 ft. diameter. To the tops of the four furnaces the materials are

raised by an air-lift and a double-lift connected to a vertical engine. Of the six hot-air ovens heating the blast for these furnaces two of them are fitted with syphon pipes, and the other four with double pipes, placed in circles. The other two furnaces have two ovens each, containing syphon pipes. The cinder is taken from the latter, upon an exceedingly good principle; rails are laid close up to the falls, upon which a trolley is placed.

A square frame, made of swinging sides, is fixed upon the trolley by means of wedges; the cinder is then allowed to run till the frame or mould is full, and when cooled the wedges are knocked away, and the sides of the mould fall back, and leave the cinder lying upon the trolley, which is drawn away, and the running cinder conducted into a second mould, so that one is being taken to the cinder mound whilst the other is filling. The material is raised to top of the two furnaces by a double lift, actuated by a small vertical engine. The pressure of blast used is about 4 lbs. to the square inch, and this is produced by two powerful condensing beam engines. The first has a steam cylinder 52½ in. in diameter, and works a stroke of 8 ft.; the blowing tub, 104 in. diameter, is at the other end of the beam. At the steam cylinder end the beam is extended in an upward curve, and attached by means of a large connecting rod to a crank and shaft, upon which a 20-ton fly-wheel is fixed. The valves of the steam cylinder are worked by cams and gearing connected to the fly-wheel shaft. There are six cylindrical boilers to supply the steam for this engine. The second blast engine has a 51-in. diameter steam cylinder, a 103-in. diameter blowing tub, and works a stroke of 8 ft. It is in every respect similar to the other engine, excepting the valves, which are worked by hand gears and the air-pump rod. There are 10 cylindrical boilers near this engine, but some of them are used for the ironworks. The object in placing them so near together was that they might at some future time be heated by the waste gases from the blast-furnaces. The stack is also built very large, so that it can, when necessary, be used for drawing off the gases. Some of the coal raised on the estate is inferior, and makes a large quantity of slack, and this at present is used for heating the boilers. Four furnaces yield 900 tons per week, and as much as 273 tons of cold-blast iron has been cast from one furnace in a week, whilst it is not uncommon to run 20 tons at a time from one furnace of hot-blast. This is a large output for Staffordshire, but it must be remembered that quantities of red ore are used, and the temperature and pressure of the blast are very high. We would call the attention of those visitors who are interested in the working of blast-furnaces to the tuyeres used here. They are the invention of Mr. Hodgetts, the furnace manager, and have long been worked with a good result. The tuyere in some respects is similar to the ordinary ones, as it is composed of two metal cones or shells, which are so welded together as to form a hollow truncated cone. It differs from the ordinary ones in that a small pipe is conveyed from the back end to within a short distance of the nose, or that part which protrudes into the furnace, and is exposed to the most intense heat; here the said pipe is connected to an annular pipe. This annular pipe is pierced by a series of small holes or jets, which face the inner surface of the nose, and has immediately behind it a flange or collar, which is welded to the inner shell, and extends nearly to the inner surface of the outer shell, leaving only a small space for the water to flow through on its way back, and thus forming a cold water chamber at the nose of the tuyere.

The action of the tuyere is as follows:—The water enters by the pipe which traverses the interior of the cone, and delivers itself through the holes or jets of the annular pipe upon the inner surface of the nose. After cooling that part it has to flow through the cold water chamber, between the flange and the outer shell, thus protecting the latter. The water then after filling the whole of the hollow space between the cones, takes its exit by an aperture at the bottom of the tuyere in the ordinary way. This patent has been in use at the Congreaves blast-furnaces for several years, and it is found that so long as it is kept supplied with water to act exceedingly well. The continual flow of water upon the nose keeps it perfectly cool, and consequently free from injury, so that these tuyeres last much longer than ordinary ones; some of them have worked for more than two years. The cool state of the nose prevents the melted iron from adhering to it, so that there is no necessity for the frequent changing of tuyeres, and the blast is thereby kept longer on the furnaces, and the result is improved working and an increased make of iron. The increase in the make has been found to be no less than 10 per cent., so that it is estimated, taking all things into consideration, that a saving of 3£ per week for each furnace is realised where these tuyeres are used. One good feature is that they are much safer, and not near so liable to burst as the ordinary ones, and therefore recommend themselves, as they are both economical and safe.

The Congreaves Ironworks are close to the blast-furnaces. There are four forges, the first containing a large helve and two sets of four rolls, driven by a condensing beam-engine, with a cylinder 43-in. diameter. The same engine also drives the 16-in. merchant mill, and a splitting-mill. Two other forges have their machinery, consisting of two helves and two trains of rolls, arranged on each side of a condensing beam-engine, the same size as the one mentioned above. The fourth forge contains a helve and train driven by a smaller engine. There are 40 puddling-furnaces in these forges, also cutting-down shears, and in the 16-in. mill there is a Smith's steam-saw. At right angles to the foregoing there is a plate-mill with three pairs of rolls, a 10-in. mill having three pair of rolls, and a 10-in. mill also having three pairs of rolls. These are all driven by a condensing beam engine, with 46-in. cylinder. To the mills there are 17 heating furnaces and an annealing furnace, and several pairs of shears. The boilers which furnish steam for the foregoing engines are all fired with slack. A small beam engine works two pairs of scrap shears, and two lathes in which all the rolls for the works are turned. The fettling cinder for the forges is burnt in eight kilns, just outside the works. Near the ironworks there is a large carpenters' shop, in which all the timber is prepared for the works and collieries. In this shop there are two circular saws, a wood-turning lathe, a vertical saw, and a drilling machine, all driven by an 18-inch cylinder high-pressure beam engine, supplied with steam from two cylindrical boilers. All the castings are made in two foundries near the blast-furnaces, at which the iron is melted in a cupola and two air-furnaces. In the fitting shop there is a planing-machine, three lathes, a shaping machine, and a drilling machine, all deriving their motion from a 14-in. cylinder horizontal engine. There are blacksmiths' and chain-makers' shops, containing a small steam-hammer, and a re-heating furnace. There is an extensive plant for making both red and fire-

bricks. The fire-clay is got from the company's own pits, and is manipulated in grinding and tempering machines, driven by a 13-inch cylinder high-pressure beam engine. It is then moulded by hand into the required shapes, and burnt in kilns. The clay for the red bricks is got near to, and a small horizontal engine draws up and grinds it. A narrow gauge railway runs all over the estate, and upon this there are three locomotives.

The Nine Locks Ironworks, Brierley Hill, are the property of the New British Iron Company. They consist of three forges, and the same number of mills. These works are rather dilapidated, as they have been pulled about by the mines which are being worked underneath. It may not be uninteresting to say a few words on the mine used at Congreaves. The red hematite is from the Ulverston district, and is the anhydrous sesquioxide of iron; it contains from 85 to 95 per cent. of peroxide of iron, and from 60 to 70 per cent. of pure iron. The brown hematite, or hydrated sesquioxide of iron, is from Froghall, North Staffordshire, and is there found in the lower coal measures; it contains 37 per cent. and upwards of pure iron. The quality of the iron made from it is superior, and the ore usually contains almost a sufficient quantity of lime to flux itself. The native ironstones, or argillaceous ores—the gubbin and whiststone—yield about 37 per cent. of pure iron.

INTERNATIONAL COMMUNISM, AND TRADES UNIONS.

SIR,—The discovery of their power in combination marked an era in the condition of the working classes. Even in the old times, when such combinations were forbidden by our laws in some trades, they succeeded in establishing agreements amongst themselves as to the restriction of the number of apprentices in proportion to journeymen, piecework, rates of wages, &c.; and these were more or less recognised and obeyed by the masters, as customs of the trade. When disputes arose the men often left work in particular workshops, though there was nothing approaching in regularity and system to the strikes of a later period. If the masters succeeded, as they often did, in finding hands to replace those who had turned out, and in carrying on their business in their own way, rioting, destruction of machinery, personal violence, arson, and assassination were the almost invariable results. Breaches of the law seemed the only and natural resort of the united workpeople, all whose confederacy existed in defiance of law. Thus, a character of turbulent resort to force was at the outset stamped upon Unionism, from which, even when sanctioned by law, it has never since freed itself. Down to this day almost every dispute between masters and men, or between the workpeople themselves, leads in some places and in certain trades to atrocious outrages. Trades Unions were upon their trial when the Commission was issued to examine if these crimes, which they indignantly denied, were or were not part of their system, instead of being, as they alleged, casual offences, with which they had no connection—which they deplored, but could not prevent. This discreditable falsehood utterly broke down before the Commission. Despite of disgraceful evasions of every kind, by help of destroying and mutilating books and records, and suborning lying witnesses, the truth could not be hidden. The entire system of Trades Unionism was proved, upon the clearest evidence, to be deeply tainted with gross tyranny, enforcing their decrees by crime and violation of the law in the most cruel and unscrupulous manner. This disgraceful stigma remains their brand to the present hour, even after their failure to prove before the Committee that they were clear from crimes of violence. To this hour the Trades Unions have never spoken out boldly and clearly, denouncing all coercion in every shape and degree; and too many amongst them blame the Paris Commune as unwise and excessive, rather than as vicious in principle. They have thus thrown away a grand opportunity, as I long ago warned them in your pages that they were doing.

Never in my memory have all the upper and middle classes been so heartily, and all but unanimously, disposed to elevate the working class, and take their claims into consideration with sympathy and respect. But let the Trades Unions rest assured that with this feeling mingles the fixed determination not to abet or tolerate Trades Unions in any tyranny or coercion of independent workmen. About this freedom of labour the House and the country will not endure any equivocation or tampering. Had the leaders of Trades Unions risen to comprehend their position they would themselves have brought in the Bill freeing labour from all the shackles of coercive intimidation, and have thus remained masters of the position, respectfully consulted and deferred to by the House in all relating to working men's questions; from which position they are so far fallen as to have been reduced to disputing the Bill to prevent coercion clause by clause, struggling as to whether one or two men should be the lowest prohibited number of a trades picket. Their great error has been the same I pointed out in my letter on French communism—the attempt to produce equality by reducing all to the lowest level. This is, perhaps, the most crying fault of Trades Unions. Leaving out of view the competition of the world, and the palpable truth that nothing but the best work can continue to command the best wages, they persist in endeavouring to divide work and wages amongst all in a trade so that no one workman may be allowed to earn more than another, and to measure the work not according to the fair productive power of each workman, but by the number amongst whom they think it ought to be divided.

To such Unions it is clear that few first-rate workmen of high moral character will belong unless under coercion, the days of which, it may be repeated, if not past are limited. It is equally clear that such Unions if wholly successful in regulating work, according to their own ideas, would soon leave our country the hindmost instead of the first of manufacturing nations, beaten in the contest by all other hives of industry not cramped by such fatal fetters. But it may be hoped there is no danger of their having any chance of doing this now when the eyes of the country are upon their doings, and the full truth has at last come out.

Turning once more to the lessons we may learn from the present state of things in France. Let our working men reflect on the mighty power there revealed of combined temperance and economy. The French peasant, scared by the recent war into fear for his hidden savings, which hitherto he concealed in what he thought the safest place of deposit, suddenly appears to the utter astonishment of all who knew not of his stores as a large proprietor of the French funds now being raised to pay off the expenses of the late ruinous war. And this has been gradually gained little by little with toil and self-

denial of means of living which to our working classes, with their habits, would not keep them from the workhouse. If anything like this standard could be reached in this country not many years would pass before, with our greatly higher receipts from wages, the operative class would be the richest in our community. All that could be enjoyed in their class and more would be fairly within their reach. Education of the best and highest character, dwellings with all surroundings of health and comfort which the latest improvements afford, would be as much numbered amongst family necessities as the air we breathe and the light we dwell in.

Backed by efficiency of means, skill, and character, co-operation would be a uniform success instead of a frequent failure for all who preferred combining to rise to the rank above them in their native land, instead of founding large fortunes in our colonies. To this our Trades Unions ought to help them, and would, if they could, only be directed to elevate their members as workmen and as men, if they only could be convinced that the highest wages are only to be permanently secured by skilled work and agreement with employers, in place of contests which always tend to damage and hinder business, lessening the fund from which wages are paid. The foundation of this happy state of things is laid when the truth is understood and acted upon that much accurate knowledge of the state of any trade or manufacture is needful for the working man to know what he really ought to have and may expect to get as the highest wages at any given time. When the governing powers of Trades Unions act on the conviction that it will never do to ask for all they think they would like to get, leaving the employers to take care of themselves, but that the settlement of wages is a two-sided question to be discussed and settled by conference and arbitration if needful, prepared to accept the result if not all they expect at the time, then the upward movement in the condition of our workmen will have fairly commenced and taken a long step.

But for this all mischievous absurdities about international communism must be swept to the winds. All classes in each separate country need union and mutual help and sympathy for their full development and greatest success. Our working classes acting on this conviction have friends and helpers on all hands. The wicked absurdity of setting the working class at war with all other classes, and destroying education, religion, and property, because those possessing them are raised above the lowest of the poor and ignorant, can only end wherever it has a chance of raising its head in civil war, as it has just ended in Paris. Perhaps in no country in the world would all that is worthy in all other classes rise with sterner resolution to stamp out such wicked folly than in England. Those who are old enough to remember the reaction amongst us, of our abhorrence of the crime and folly of the first French Revolution, know to what lengths it carried the nation in fettering the liberty of the people. Some of these fetters are only now broken, having been borne for more than half a century.

Let us hope our working classes have so learnt from the past as to prevent all danger of any recurrence to aught like this in the future. They have now a fair share in the government of the country, and it may be repeated, if their leaders can only prove equal to the opportunity, a great future is before them. A MAN OF EXPERIENCE.

London, July 27.

IRON SMELTING—THE FERRIE FURNACE.

SIR,—If "No. 1 Ironmaster," before writing his last letter (in the Supplement to the Journal of July 22), had recalled some of the expressions in his first, in which he voluntarily launched into a subject "involving so much experience and deliberation in its issue," he would scarcely have taken objection to my saying he had opened the subject "vauntingly." He misquotes me in saying also "irrelevantly." His was the charge of irrelevance on my venturing, in following up the subject, to choose my own path.

Whatever may be thought of "No. 1 Ironmaster's" arguments, there can be no two opinions as to the vigour of his abuse, but I fail to perceive magnanimity in his attempts to give my letters the character of attacks on Mr. Ferrie or on the Ferrie furnace. Whatever I have written has been directly applicable to the productions of "No. 1 Ironmaster" and his friends he is pleased to call "the mere hirelings of a corruptible press."

Is it not wonderful that "A Scotch Ironmaster" should only now have discovered a furnace yet higher than those of Gartscherrie? For its newness to him no one who has read his letters will doubt, and yet it is evidently only the result of the researches that changed the vagueness with which he wrote of the Gartscherrie furnaces in his first to the precision in his second letter. In his first letter he asserted that the working of the high furnaces at Gartscherrie was unsatisfactory. The burden of proof rests with him. Granting that he was right, what would be thought of the astuteness with which he credits the Gartscherrie Company, were they in the opportunities of 20 years (no need in that time for blowing-out for the purpose) not to reduce their high furnaces to the height of furnaces working satisfactorily alongside them? "No. 1 Ironmaster" sees no difficulty in raising furnaces. Whence arises his difficulty about the much easier process of lowering them?

As to the friction question, the readers of the *Mining Journal* could only know "No. 1 Ironmaster's" letters as they were printed; and he must have known, when quoting in his last from his own previous letter, that friction did not appear at all. On this question, "No. 1 Ironmaster's" first argument was reduction of pressure, and on a superficial glance this appears plausible, and it is only on this point the remarks of Mr. Bessemer and Mr. Plum, in the discussion on Mr. Ferrie's paper, bear. But a very little attention will convince anyone that the pressure can only be reduced by the materials jamming in the chambers of the Ferrie furnace, and in such a state of matters it would be impossible for the charge to get down, and there would speedily be an end to the working of the furnace. Then, as to friction producing regularity, the two things are diametrically opposed, and increased friction is only admissible as an argument for irregularity. On this head the favourable working of the furnace is a proof that the friction of the cross walls is so slight that the descent of the materials is not seriously interfered with, but goes on regularly, in spite of that friction.

"No. 1 Ironmaster" denies that Mr. Ferrie has heightened his furnace. This is special pleading with a vengeance. What has Mr. Ferrie done? If he is any authority on the form of his own furnace, he has followed very nearly the later Middlesbrough furnace, his cross-walls and retorts making really no essential difference.

Perhaps "No. 1 Ironmaster" may yet learn that blast-furnace and retort coking are the same in their condition, and he will learn this the more quickly if he refers to Bunsen and Playfair's *Analyses of Blast-Furnace Gases*, presented to the British Association in 1845. This question has long been at rest, and the proof that the action of the flame—the coking agent in "No. 1 Ironmaster's" eyes—is in its influence almost infinitesimal is very easy, and in the hands of every smelter.

Then, as to 65 per cent. of coke in Scotch coals, let "No. 1 Ironmaster" coko a weighed quantity of any fair sample of average coal in a tobacco-pipe closed with a piece of clay, and weigh the coke produced, and I venture to say he will alter his opinion. As to the Admiralty reports (it is, by the way, another surprise to find that "Professor" Richardson had anything to do with these), if "No. 1 Ironmaster" looks into the original report, or indeed scans the analyses with a little care, he will be convinced that the figures given as percentage of coke do not indicate the coke that would be produced in a retort. "No. 1 Ironmaster" need not say "Smelter" says Mr. Hunter quotes, &c.; I did not say it at all, nor was it on my authority that I said English ironmasters smelted every day with 18 cwt. of coke. Mr. Bell, who was put forward as (and is) an undoubted authority by "No. 1 Ironmaster," gives the figures.

In his last paragraph "No. 1 Ironmaster" goes into the Transactions of the Iron and Steel Institute for proof that the coke in the Cleveland district is invariably 22 cwt. per ton of pig. Now, the rendering of Mr. Bell's arguments given by "No. 1 Ironmaster" is preposterous, as can be readily ascertained by anyone who refers to the Transactions. He mixes up two sets of arguments. Mr. Bell gives 18 cwt. coke per ton of pig at Consett, 17 cwt. at Ferryhill, and says with the same mixture, viz.:—half hematite and half Cleveland stone, Eston furnaces use the same quantity of coke. In altogether another connection he says at Clarence and Eston the

quantities are alike, 22 cwt., but this is clearly with both sets of furnaces using Cleveland stone; and again, in the discussion on Mr. Ferrie's paper, he says 22 cwt. is about the consumption in the Cleveland district, but there can be no doubt he here refers to furnaces working Cleveland stone, and excludes from consideration those using richer ones, for in his own papers he distinctly gives lesser proportions, ranging from 17 cwt. to 20½ cwt., for mixtures of Cleveland stone and hematite, with a produce of about 48 per cent. pig-iron. What use can there be in labouring from detached portions of Mr. Bell's papers to establish a certain invariable proportion of coke, when he publishes tables giving very variable proportions?

I can make neither head nor tail of the latter part of "No. 1 Ironmaster's" last paragraph. He says, "If 'Smelter' had any practical knowledge of the trade at all he ought to have known from the mixtures used at Calderbank that such results must necessarily have followed." What results? I cannot make out, and fear that "No. 1 Ironmaster" is no wiser than I am, but has got muddled as hopelessly in ending this letter as in his attempts to give us his opinion of the Ferrie furnace in his previous one. SMELTER.

COLLIERY ASSURANCE.

SIR,—In the article bearing upon this subject, published in last week's *Mining Journal*, it is shown that the deaths from accidents in collieries vary from 867 to 1484 in the year, which gives a difference of 50 per cent. against the heavy year; but even taking the 1484, and allowing 100% for each death, and 20% for each injury (estimating five non-fatal accidents for one fatal), it would require but 300,000% per annum to cover all the risk. To raise so small an amount certainly could not offer any difficulty, if the tonnage were put upon the coal, or still better, on the value of the coal. Yet, instead of this, it is proposed to complicate the matter by fixing rates for the colliery property, and rates for the colliers; though it is likely the colliery proprietors would decline the trouble of collecting from the colliers, and the colliers would forget half the time to take out their insurance tickets. Again, colliery owners producing low-quality coal would naturally object to pay the same premium per ton as those raising coal selling at a high price.

By taking the premium on the value of the coal justice might be done to all interested. The annual value of the coal raised being 27,500,000% per annum, it follows that 3d. in the 1% value would give an income of 344,000%, or sufficient to provide the 300,000% above mentioned, and leave 44,000% per annum for the company's profits. As this contribution of 3d. in the 1% would be equally for the benefit of the masters and the workmen, the premium should be paid half by each, any colliery proprietor effecting the assurance being empowered to deduct the colliers' proportion from the wages next payable to them. For this I am aware an Act of Parliament would be required, but as it would be for the general welfare of the colliers themselves, I cannot suppose there would be any difficulty in obtaining it. The 44,000% of course would not suffice for the profits of the assurance company, but it would form a handsome addition to the amount receivable from premiums to assure against damage to the mine. This should be totally distinct from any considerations of accidents proper, because it is, I think, obvious that if the company are to pay for mine damage out of the same fund as that created to pay the sufferers by fatal and non-fatal accidents, it would be impossible to construct an equitable scale of premiums, because a single accident like the Oaks, where apart from the deaths and losses in direct connection with the accident, there was the almost incalculable loss resulting from the burning of the coal and the damage to the workings. The occurrence of one or two such accidents as these might either make the company insolvent, or compel such unsatisfactory compromises as would very seriously damage its reputation.

The assurance of the colliery property would, I think, be much more difficult than is generally supposed, because in the case of a coal mine the danger, or cause of danger, cannot be got at and arrested as readily as a fire on surface; but still, 3s. per 100% seems excessively high for premium, because heavy damage to a colliery is so rare that the fund would seldom be drawn upon at all, though each individual draw would be a large one. If this item were fixed at 2s. per 100% I am sure it would be more than ample, but the difficulty would be to find the basis. Suppose, for instance, a travelling road is so damaged that the manager considers it preferable to substitute a new road for it than to put the old one right. Perhaps it has been discovered since the first road was made that it might have been in a better place, so the accident is availed of as an opportunity for an improvement. The damage in such instances is very difficult to calculate, and would, I fear, be the cause of constant dispute; but perhaps the secretary or actuary of the company could explain the mode by which disputes in this matter are to be avoided, which will increase the confidence of both coalowners and colliers.—Aug. 1. VIEWER.

THE INSURANCE OF COLLIERY PROPERTY.

SIR,—In reference to the enquiry of a Correspondent in the Supplement to last week's *Journal*, I may observe that there is no duty now payable to Government on the insurance of colliery property. By the Stat. 28 and 29 Vic., c. 30, sched. B, the duties on fire insurances were reduced to 1s. 6d. per cent., and by Stat. 32 and 33 Vic., c. 14, part 3, ss. 12 and 13, the above percentage duty was repealed, so that fire insurances on collieries are now free of duty. T. T.

DENUDATION OF THE COALBROOKDALE COAL FIELD.

SIR,—I am not a little astonished at reading Mr. Randall's letter in the Supplement to last week's *Journal*. In that letter he completely contradicts what he has published in his ninth and thirteenth letters addressed to the *Mining Journal* in the autumn of 1869. There are two points relative to which I have quoted his letters:—1. Whether the dislocations of this coal field took place before or after the denudation known as the Symon fault.—2. Whether the valley of denudation was subsequently filled in by Upper Coal Measure or Permian. On the first point, let us take Mr. Randall's own words in his thirteenth letter, and the fuller the quotation from that letter the more unmistakable is his intention of showing that he considered faults had let down the coal seams prior to the denudation. He says—"Mr. Brough appears to assume, and Mr. Parton now states positively, that the other side of Salop there is no dislocating fault along the line of estuary." So far from this being the case, the whole of the coal strata found in the Halesfield pits of the Madley Wood Company was saved from denudation by the mere fact of its having been let down by faults below the same strata which suffered from denudation in the neighbouring field of Stretchley. Had the coal strata of the Halesfield pits retained the same level as that of the Grange it must have been affected by the water of the estuary, but having been let down more than 300 ft. below it escaped the cutting action of the waves. Again, the coal strata at the New Kemberton pits was let down 100 ft. or more below that of Halesfield—had it not been so the fact that it is 900 yards further along the old coast-line in the direction of the estuary would have proved its destruction, but it escaped from the same cause as the coals of the Halesfield pits escaped, while the coal measures of Hill's-lane again, which stood higher than those of either the Kemberton or Halesfield, although further removed from the east, suffered largely, not only the Top coal, but the Big Flint coal, 100 ft. below it, having been completely destroyed—thus affording an interesting and convincing illustration of denudation."

In a note to my article in the "Geological Magazine" I quoted the passage printed in italics, which I considered sufficient to show that Mr. Randall's views were different to those adopted by me in the article. I am now charged with making *ex parte* and garbled statements, being borne forward by an intense anxiety to have it supposed that to me belongs the singular merit of having arrived at the conclusion that the dislocations took place subsequent and not prior to the denudation. Mr. Randall says—"A conclusion, however, which no one ever doubted." Why on earth, then, does he say in the letter before quoted the whole of the coal strata in the Halesfield pits was saved from the denudation from being let down by faults? Even in his letter of July 29 in your *Journal* he admits that the interpretation I put upon his Letter XIII. is what he meant, for he says—"It is true, not seeing why they should have been so spared, I thought it just possible—seeing that we have the central focus of great disturbances at several distinct periods in the immediate neighbourhood—that the coals in these pits might have escaped the action of the waves by reason of having been let down below them."

Mr. Randall has stated quite positively in his thirteenth letter that such is the case. He now says he thought it just possible. When I quote him, and say that I have arrived at an opposite conclusion, he tells me that no one ever doubted my conclusion, and that his thirteenth letter is not capable of the construction I have put upon

it, and that for my purposes I have misrepresented his views. The reader has read the whole passage, and can judge for himself. The second question between us is, whether the valley of denudation is filled up with Upper Coal Measures or Permian? I have represented in Fig. 1 to my article the Older Coal Measures, with the denuded edges of coal, extending step by step, and covering up those denuded edges I have shown Permian rocks. This figure I intended as a representation of what Mr. Randall says in his ninth letter:—

"The valley of denudation, however, does not appear to have been filled up by these younger members of the Coal Measure series—hence the Permians come up and overlap the whole along an undulating line running north and south parallel with that of the Symon fault. At several places they may be seen overlying the younger members of the Coal Measures south of the old coal field, also the latter group, where the younger are denuded. It is remarkably instructive as regards the nature of this fault that just on the line where the coal seams terminate the Permians make their appearance, rapidly increasing in thickness as one approaches the other of the former disappear."

The parts printed in italics were quoted by me, and I drew my diagram in accordance with the language of the second quotation. No one who has seen the diagram will say that it is contrary to that description, and if I had quoted the portion left out it would not have affected the sense of those portions which I have quoted. It would have tended in some measure to contradict the passages quoted, especially the passage "also the latter group, where the younger are denuded," because it had been held that the Permians rested upon the denuded edges of the Older Coal Measures, and filled the valley of denudation. However, Mr. Randall calls my interpretation of this Letter IX., as illustrated by Diagram 1, "unfair and unjust." I say, just the opposite to Mr. Randall, that the valley of denudation is filled up with the Younger Coal Measure, and that the Permian does not rest upon the denuded edges of the Older Coal Measures, and I say that Diagram 1 represents honestly and justly what he says in Letter IX. I think it only fair to myself to state that the enquiry was not merely that of an amateur geologist—it was instituted by me as part of a very responsible task undertaken by me for the Royal Coal Commission. Mr. Randall's letters led me to suppose that considerable quantities of coal would be preserved along the borders of the Symon fault by downthrow faults which were in existence prior to the denudation, and it would have been my duty to make a note of this fact in my report had it been supported. I laid the question before Messrs. Scott, Parton, and Edward Jones—the result of our correspondence being that practical measurements contradicted what Mr. Randall once positively stated, then thought to be just possible, and now says he never doubted the conclusion we arrived at.

Now, Sir, it will be a useful and substantial result of this correspondence to nail Mr. Randall down to one opinion or the other, and as the matter stands I consider he admits that the dislocations took place after the denudation of the Symon valley, and that he admits that the valley is filled up with Younger Coal Measure, and that the Permian rocks do not come up and overlap the denuded edges of the Older Coal Measures. If he admits this we are agreed on the geology of the matter, and if he does not admit it I shall be glad to hear from him what evidence he has to the contrary. At the same time, perhaps, he will accept as a friendly suggestion from a brother geologist that we are none of us so infallible in our views as to justify casting stones, and it is very unbecoming in us to suggest that the motive we have in putting our opinions into print are the paltry ones of gratifying a personal conceit. Few people have written more than Mr. Randall; but we had better stick to the objects of science instead of indulging in personal recrimination, which I decline to do. If Mr. Randall does not approve of the views expressed in my paper on the Spirorbis Limestone in the Forest of Wyre let him state his objections in the *Mining Journal*, and I will with pleasure accept them or answer them.

Nothing more do I wish for than a complete investigation of the subject, and that is the reason I read the paper. The reader must please to bear in mind that the object of my article in the "Geological Magazine" was to show that denudation had caused the apparently anomalous condition of the strata of the southern part of the Coalbrookdale coal field as compared with the north, and the reference to Mr. Randall's writings was merely incidental.

DANIEL JONES, F.G.S.

TELEGRAPHIC SCIENCE.

SIR,—My attention has just been drawn to an article headed "Submarine Telegraph Investments," which appeared in the Supplement to the *Journal* of July 15. So much misconception has arisen with regard to the labours and the relative merits of the actual workers in the fields of electrical science as applied to telegraphy, and so many eminent names are conspicuous by their absence from any mention in your own article, that I am emboldened to venture upon the task of sketching a brief chronological statement of the origin and progress of the electric telegraph.

In the year 1809 Dr. Samuel Thomas von Soemmerring, a distinguished member of the Academy of Sciences at Munich, invented the first galvanic telegraph; and in 1810 he constructed a telegraph around his residence, the wires being insulated with India-rubber and varnish. In the same year he also invented an alarm, by which the electric current discharged a train of clockwork. In 1811 Dr. Soemmerring, in conjunction with Baron Schilling, a Russian nobleman, ascertained by experiments across a canal and along the river Isar that the earth could be used in place of a return wire. On July 5, 1811, the Emperor of Austria, after examining Soemmerring's telegraph, expressed his desire to have a line of telegraph established between his capital Vienna and his palace of Laxenburg, a distance of nine miles.

In 1812 Baron Schilling, who had originally derived his information in electric telegraphy from Dr. Soemmerring, succeeded in making a cable which was so well insulated that by its agency he was enabled to explode powder mines across the river Neva at St. Petersburg. In 1814 Baron Schilling, having joined the army, entered Paris with the allied troops, headed by the Emperor Alexander I., and during his stay in Paris with his subaqueous conductor several times, to the astonishment of the lookers-on, ignited gunpowder across the Seine. In 1815 Baron Schilling, at Soemmerring's residence, made the acquaintance of Schweigger, who subsequently invented the galvanometer, or electric multiplier.

In 1816 Prof. Cooke, of Philadelphia, U.S., invented a telegraph similar to Soemmerring's, he being apparently unaware of Soemmerring's inventions.

Between the years 1820 and 1830 Baron Schilling, at St. Petersburg, made the first electro-magnetic telegraph, using Schweigger's galvanometer. This, the first magneto-electric telegraph—like that of Cooke and Wheatstone of later days—had five needles, which number Schilling gradually reduced to one. The Emperor Alexander took great interest in Schilling's labours, and frequently visited him to witness his electrical experiments. Upon one occasion—in April, 1830—Schilling, having made preparations for a grand experiment to be witnessed by the Emperor, handed to him a wire, which he requested him to touch another wire, and at the same time to look in the direction of a distant mine. The Emperor did as he was requested, and at the moment of contact between the two wires a cloud of smoke and debris arose from the exploded mine. Great surprise, almost amounting to consternation, was the result of that then wonderful experiment, and great applause was bestowed upon Baron Schilling.

In the year 1835 Schilling made a journey to the West of Europe, taking with him an improved and less complicated apparatus which he had succeeded in constructing, in the course of his continental researches and experiments, between 1830 and the period just mentioned. Prof. Muncke, of Heidelberg, was so pleased with the instrument that he immediately ordered a similar one. Mr. (now Sir) William Fothergill-Cooke, happening to be temporarily residing at Heidelberg, was taken by Mr. Hoppner, a pupil of Prof. Muncke, to that learned professor's lecture room. Mr. Cooke upon that occasion saw this instrument, and struck with the idea that it might be made to work through great distances, immediately threw up his previous occupation, and henceforth devoted his energies to the realisation of electric telegraphy, returning to England in April, 1838.

In January, 1837, Mr. Cooke submitted to the directors of the Liverpool and Manchester Railway a proposition for telegraphing through their long tunnel at Liverpool. Having taken counsel with Prof. Faraday, Mr. Cooke, by the advice of Dr. Roget, visited Prof.

(now Sir) Charles Wheatstone. This visit took place in February, 1837, and in the following May Mr. Cooke and Prof. Wheatstone resolved to unite their interests, and introduce telegraphs into England. They applied for a patent for their improved telegraphs, and entered into a partnership contract in November of the same year. Their instruments differed from Baron Schilling's in this, that the needles were placed vertically instead of horizontally, the motion of the needles was limited by stops, and one wire was made to serve for sending as well as for receiving messages.

It is a fact ever to be remembered that the first line of telegraph in England was constructed by Mr. (now Sir) William Fothergill Cooke. This germ of a giant system—destined to interlace all quarters of the earth—extended from London to West Drayton, on the Great Western Railway, and was followed in 1840 by the construction—also by Mr. Cooke—of a telegraph along the Blackwall Railway. It was Sir (then Mr.) W. Fothergill-Cooke's energy that overcame, in the early stages of telegraphy, the difficulties connected with the construction and insulation of telegraph wires, and to him and to his indomitable perseverance Europe is indebted for the introduction of a practical electric telegraph. How has Europe acknowledged this indebtedness? How has England, whose wealth has been increased, and whose material resources have been so much enlarged, rewarded this her foremost son in the introduction and early development of this marvellous aid to her commerce and this adjunct to her greatness? Is it not an unmitigated reproach to his country that the only reward with which she has delighted to honour the man whose name should be perpetuated throughout all time is the bestowal of an empty title, which will die with him—a recognition which places him on the same pedestal as the mayor of some provincial town fortunate enough to receive a royal visit, or a busybody in the foundation of some hospital or asylum?

It is with deep regret that I perceive an inuendo is applied to Sir Charles Bright that he was once a telegraph clerk. Sir Charles is a man of education and a gentleman. But would it be logical to detract from the merits of men who have shed lustre upon this nineteenth century because they have risen from the ranks? What, it may be asked, was George Stephenson? Originally a miner! Or Michael Faraday? A printers' devil!

Great prominence is given to the name of Sir Curtis Lampson, Bart. The world would probably like to know in what way this gentleman has contributed to the perfection of telegraphs, especially of telegraph cables. If the amount of money this gentleman risked in cable enterprise be his title to public recognition, and his name to the homage and reverence of posterity, then should John Pender and the late Thomas Brassey, who each volunteered to subscribe a sum of nearly 200,000l. towards solving the great problem of the practicability of a long cable, have laid claim to a high place in the peerage of their country.

It is remarkable that the only two hereditary titles awarded in connection with the Atlantic telegraph were bestowed upon two gentlemen who were strangers to telegraphic fame, and who had no part nor lot in overcoming the difficulties which beset that marvellous and unparalleled enterprise. You remark that the officers of the company, much as they deserve praise, were nevertheless paid servants of the company. This is not strictly true. When the first cable made and laid under the auspices of Sir Charles Bright, Mr. Whitehouse, and Prof. (now Sir) Wm. Thomson had failed, and the Atlantic Company was in extremis, the late Robert Stephenson undertook to advise the company gratuitously, and he induced Mr. C. F. Varley, F.R.S., to accept the office of electrician without any salary. From 1858 to 1864 Mr. Varley laboured unceasingly in his laboratory, at the now historical soirees held at Mr. Gurney's residence at Hyde Park Gate, and upon more public occasions, to demonstrate the practicability, not only from a scientific but also from a commercial point of view, of bridging the Atlantic by one continuous electric span, and it was undoubtedly mainly to his exertions and the confidence inspired in the mind of the late Mr. Brassey, who volunteered to make himself responsible for 60,000l., being one-tenth of the whole cost (600,000l.) of making and laying the cable, that the capital was at last subscribed for the second and gloriously successful effort.

Mr. Varley demonstrated by actual working that the time occupied in signalling from Hyde Park Gate through England, Holland, Hanover, and Prussia, to St. Petersburg, Moscow, back to Vienna, Paris, and London, was something over a second; and it was this actual retardation through this continuous circuit which convinced Mr. Brassey of the genuine character of the experiment. The difficulties attending the investigation of this great question led Mr. Varley to construct his celebrated artificial cable, an electrical type of the Atlantic cable proposed by him. It was with Mr. Varley's artificial cable that the dimensions of the existing cables were determined and their commercial success ensured. As regards the working of cables, Mr. Varley united his efforts with those of Prof. Thomson in the year 1864, and the result has been that by their combined inventions the working speed of long cables has been increased seventeen times.

Thus Mr. Cooke, the originator of the practical electrical telegraph, met with a tardy recognition, in the shape of a knighthood, many years after witnessing the triumphant result of his labours. Prof. Thomson has been accorded a similar honour for his services in connection with the Atlantic cable enterprise, while of the small knot of men whose names will ever be famous in the annals of electric science Mr. C. F. Varley, F.R.S., by an oversight entirely unaccountable to those who are acquainted with his long and brilliant services in the department of land as well as of ocean telegraphs, as yet remains without any such honour. England, by a strange perversity, too often showers down her honours upon men whose only claim to distinction arises from some train of accidental circumstances, while she suffers those of her sons who contribute most largely to her glory and renown to remain in the cold shade.

A TELEGRAPH ENGINEER (of 25 years' standing).

MINING IN WEST CORNWALL.

Sir,—It must be very cheering to the inhabitants of Cornwall to see the return of "the good old times." That county has experienced a long and trying night of adversity; indeed, so dense was the darkness that many despaired of ever seeing the dawn of day. The old adage is true, "*Nemo mortuorum omnibus horis sapit*." The night is over, and the day is at hand, the clouds are being dispersed, the hills are tipped with verdant and gold, the sun of prosperity is again arising, with all the effulgence of former times.

Perhaps there was no part that suffered more from the panic in mining than the district of Hayle. So great was the collapse, that only one or two mines remained working in the neighbourhood, and those must have stopped had not the adventurers and managers been of the most persevering and indefatigable disposition. I congratulate the adventurers of the Mellanor on the success they have achieved, and sincerely hope that West Wheal Tremayne will soon follow suit. It must also be gratifying to the people of that neighbourhood to see new mines springing up around them, which will, in all probability, prove sources of wealth in ages to come. I see no reason why such should not be the case, seeing the vast amount of virgin ground that still remains, traversed by the richest tin and copper lodes in the county.

When in London, a few days ago, my attention was called to a mine named Wheal Lucy, situated on the Phillack townships, contiguous to the St. Ives Bay, opposite to the Providence Mines, in Lelant, and no doubt on the same course of lodes. The geological formation and position of this mine is most favourable for the production of tin, being on the western side of the basin of Killas, near the junction of the granite. There is every probability that this, on the eastern side of the junction, will prove as productive as the Providence, on the west; the same kind of phenomena, however, exists—the carbonates, for which the latter has been so distinguished, are becoming remarkable for their richness in the granite. The granitic character of the lode shows the near approach to the granite itself, that has been so productive of tin in the Lelant Mines; and the fact that the same chemical reaction has taken place in the deposition of the tin, as in those and other rich mines in the county, augurs well for the future. Some specimens of the lode that were shown me were pure granite, the silica being entirely replaced by stannic oxide—a frequent occurrence in rich lodes in and near the granite.

I may say, in conclusion, that I have known this district from my infancy, and I have no hesitation in stating my candid opinion to be that it will, before long, turn out as fine a mining district as any in the county. There are many other mines comparatively unworked, that in these times would be excellent speculations, and when I have leisure I will refer to them. J. ROBERTS. Penryn, N. W., Aug. 2.

[ADVERTISEMENT.]

GOLD MINING IN BRAZIL.

Sir,—With the able articles in the Supplement to the Journal of July 8 and 15, concerning gold mines in Brazil, I fully agree, especially as to the cause of the present unproductive state of many of

the mines in that country—that is, the lack of capital to push the works to a profitable result. By long experience in Brazil there have come under my notice a number of rich mines, worked on a miserably limited scale, and in the rudest manner imaginable, and all from want of capital to extend the works, and thereby bring them into a profitable condition. One of these mines, which has been and is now in course of working in a small way by a Brazilian (the proprietor), I could confidently recommend to any company having a sufficient capital for its proper development, and to erect crushing machinery adequate to the capabilities of the lode to supply ore. The lode is quite 40 ft. wide, of a considerable length, and at the outcrop consists of iron pyrites, very similar in character to that of the Morro Velho lode near the surface when it was purchased by the present company in 1835. A 36-head stamp, which could be erected at a small cost, would produce 500 lbs. of gold per day, equal, at the very least, to 6000l. per month, leaving a profit of 4500l. for the 30 days, and every additional stamp of the same size; as three others could easily be supplied from the lode the profits would be in proportion.

RIBERA DO SANTO ANTONIO.—The great value of the mine said to have been discovered by Dr. Liais at Ribera do Santo Antonio, near the Rio dos Velhos, I will not attempt to dispute; but if the discovery was made by that eminent geologist it must have been at a point not far from 1839, when Dr. Liais is said to have been commissioned by the Emperor of Brazil to inspect the districts of Minas Geraes. I am well acquainted with Ribera do Santo Antonio and locality, and long previous to 1869 I passed a considerable time in examining the lode said to have been discovered by Dr. Liais. The great waterfall, from the brow of the lode to the valley below, is magnificent—upwards of 500 cubic feet per minute.

All particulars can be had on application personally or by letter. Address, "R. B.," Post Office, Truro, Cornwall. Aug. 2.

MINING IN NEVADA, U.S.—THE GREAT WESTERN SILVER MINING COMPANY.

Sir,—My attention has been called to a letter in the Journal of Saturday last. If your correspondent is a shareholder he will have received an official notice from the office; if, on the other hand, he only contemplates taking a pecuniary interest in the company, I may say that before issuing the prospectus the directors not only assured themselves as to the existence and value of the property, but also as to the perfect nature of the title to it, and that immediately after the allotment one of the directors proceeded to Nevada, and last week telegraphed home to the effect that having examined the mine, and being convinced that it will prove to be a valuable one, he had completed the purchase, and arranged for immediate operations being commenced. Seeing that the location is in the heart of the White Pine district, and within a few hundred feet only of the spot from which the original proprietors of the Eberhardt Mine extracted ores worth \$1,500,000, it is more than probable that at an early date I shall be able to supply your columns with such reports as will satisfy the members of the company, even if not your correspondent, "Shareholder." I may add that the capital of the company is fully subscribed, and that there is at command for working a clear sum of 10,000l.—London, Aug. 2. J. H. THORNTON, Sec.

MINING BUREAU OF THE PACIFIC COAST.

THE INDEPENDENCE QUARTZ MINE, SIERRA COUNTY, CALIFORNIA.

Sir,—We beg to inform English as well as European capitalists that the Mining Bureau of the Pacific Coast, authorised by the Miners' Convention, held in this city on Jan. 31 last, is now in perfect working operation. Several mining claims returned from London have already been examined, and some of them approved by the board of directors. We enclose the first report on a well-known gold mining property, the examination and the contra-examination of which, including the investigation of titles of property, &c., have required not less than two months. One of the reasons of delay has been the contra-examination of the mine, which was ordered by the President of our board, on account of instructions received from London, and in order to fully satisfy himself before approving and signing the report, not only in his capacity of President of the Bureau, but in his official capacity of Vice-Consul of France. This first report is submitted to your special attention, as it will give you an exact idea of the practical work performed by the Bureau. The prerogative granted to our President of the right of ordering a contra-examination, without any previous notice, is the proof of the earnest desire and intention of the board of directors to carry out in good faith the objects set forth in the constitution and bye-laws which govern the Bureau.

The plan of organising such an institution on the Pacific Coast, notwithstanding the bitter opposition of which it has been the object from a certain class of mining operators, has been successfully carried out, and such is now the reaction growing daily in its favour that we have deemed it expedient to issue a call for a new Miners' Convention, which will assemble on July 31, in the Senate Chamber of this city, for the purpose of ratifying the constitution and bye-laws of the Bureau, and approving the action of its directors.

The Convention will include one delegate from each mining county of the States of California, Oregon, Nevada, and the adjoining territories, including Utah. Among the most important measures which are to be brought before it for discussion and adoption will be that of authorising the organisation without delay of a central corresponding Bureau in London, with corresponding agencies in the leading financial markets of Europe. You will easily perceive the real advantages of that important measure, which will complete the realisation of our original plan—the development by the Mining Bureau of the mineral resources of the Pacific Coast with the aid of foreign capital, and the protection of that capital by the London Corresponding Mining Bureau. The Convention, which will be composed of men representing the true and legitimate mining interests of this coast, will not fail in giving its unanimous sanction to a measure which is well calculated to satisfy both practical miners here and capitalists abroad. Finally, we should state that with such facilities as are now offered by the Mining Bureau to examine, and if necessary to contra-examine, mining properties it can be no more excuse for foreign capitalists if they persist in future in subscribing blindly for illegitimate and valueless mining concerns on the Pacific Coast.

J. BERTON (Vice-Consul of France), President.

E. P. HUTCHINS, Secretary.

Sacramento, California, July 8.

Report upon the Independence Quartz Mine, Sierra County, Examined by Direction of the Bureau of Mines and Mining Statistics:—

By your authority, dated May 8, 1871, and under your direction, I have examined the Independence quartz mine, situated in the county of Sierra, State of California, and beg leave to submit the following report:—

LOCATION.—The mine is known and described as the Independence, and is situated on the slope of the Sierra Buttes mountain, in Buttes township, Sierra county, California, about 2000 feet above the valley of the South Fork of the north branch of the Yuba river, distant 12 miles east of Downville, the county seat of Sierra county. The mine adjoins the Sierra Butte or Rios Mine on the west, and is an extension of that lode, the boundary between the two mines being designated by an iron bar 2 in. wide, and 1 in. thick, 2 feet long, and marked in letters thus—"S. Buttes," placed near the centre of the croppings on the west side of the ridge or backbone that divides the waters which run past the mills of the two companies. From the stake above described the Independence extends west, following the lode with all its dips, spurs, and angles 5000 feet, and was located under the mining laws of Downville district sometime during the year 1855, and has been occupied and held continuously up to the present time.

COMMUNICATION.—The mine can be reached from the Central Pacific Railroad by stage from Truckee Station, through Sierra Valley to Sierra City, distance about 45 miles; or from San Francisco by railroad to Marysville, thence by stage to Downville, 67 miles, thence to Sierra City, 13 miles, by a good wagon road. Sierra City is situated on a branch of the Yuba river, and about 2 miles from the mine. Within a year past the Sierra Buttes Mining Company have constructed a wagon road from the latter place to their mine, and this road reaches the Independence within 1½ mile, and could be continued on to the mine at an expense of less than \$1000. This improvement would bring the mine in direct communication, by wagon road, with different portions of the country, and would be an immense saving in the transportation of supplies. At present all material used (except the timber) must be packed on animals, which adds materially to the working expenses of the mine.

THE LODE.—The Independence Quartz Mining Company, organised under the laws of the State of California, claim and have possession of 5000 feet on the lode, commencing at the western boundary of the Sierra Buttes ground, and extending west and along the lode, with a strip of land 250 feet wide upon each side. The lode extends east and west, and runs nearly parallel to the valley of the Yuba river, and is enclosed in a hard metamorphic rock; it is well defined, having all the appearance of a true fissure vein, dipping to the north at an angle of about 45°, and has a width of from 20 to 30 feet, with but little waste or foreign rock in the lode, so far as it has been developed or opened.

LEVELS AND WORKING.—There are five levels open, and upon which some work has been done in the mine; they are about 100 feet apart. The principal one, and upon which the most work has been done, is called, for convenience, the Drain or Third Level, and it is reached by a tunnel 600 feet in length, driven at right angles to the lode, through which all the quartz is taken in cars to the mill, that is located near the entrance of the tunnel. Upon this level the hoisting works of the mine are situated. The principal work on the mine has been done above this drain level. In places the work has been near the hanging wall; and in other places, again, the quartz has been taken from near the footwall; and in one or two places only has the body of the lode been pierced, or either of the walls exposed. The working above the drain level having been done by parties now dead, it is impossible even to reach the cause that induced them to pursue the working of the mine in the manner in which it is found—

that is, the taking out of a strip varying from 3 to 7 feet in width, without cutting the lode from wall to wall, whereby the real value of the whole lode might have been determined. It can only be accounted for upon the idea that the machinery for reducing the quartz and saving the gold was so imperfect that only the richest and most easily worked ore could be handled. The mine seems to have been opened and worked on the principal of three shoots or rich ore-streaks in the vein, designated as the east, middle, and west shoots. In the east shoot an average thickness of 3 feet is stated to be cut from the third or drain level to the surface for a distance of 100 feet on the lode, leaving 200 feet east for a foot, between it and the east boundary line of the claim. This level has been driven east 93 feet, and shows quartz in both sides of the drift. The shaft at the hoisting works in this shoot is now sunk below the third level about 30 feet, and still sinking, furnishing rich quartz and showing free gold. A cross-cut at the west edge of this shoot shows the thickness of the lode to be 25 feet. Between the east and middle shoots this level is run in the footwall for 315 feet, when the lode is again reached, and we find a shoot through the lode taken out of an average width of 8 feet, leaving a body of quartz above and below the shoot, which extends for 400 feet along the lode; the upper portion of this shoot, except a small place, has caved, which makes this part of the mine difficult of access. Between the third and fourth levels this shoot is stopped out about 290 feet on the line of the lode, with an average thickness of 10 feet. The fourth level is extended from the slope east 25 feet and west 40 feet, in quartz, with no indication of either wall. The middle shoot is stopped out on the fifth or lowest level a distance of 175 feet on the lode, with an average thickness of 15 feet, leaving quartz upon both sides and without exposing either wall, the lower end of the shoot being near the footwall. This level is extended east, about 100 feet, with a small shoot overhead, and west on the 210 feet, in quartz the whole distance. From the middle shoot, west, the drain or third level is extended partially in the footwall to the eastern edge of this shoot, in the west shoot 75 feet, when we reach the west shoot, and it is stopped out above this level to the surface with an average width of 90 feet, and thickness of about 6 to 8 feet, running up obliquely towards the middle shoot, leaving a small pillar between the middle and west shoots. From the east edge of the slope the level is extended west 145 feet, and is run on the hanging wall for a short distance, thence into the lode and along it to the end of the drift. The work is now going on at or near the end of the drift, the quartz being apparently the same kind as is in the slope below. At the west end of this level the width of the lode, as it appeared, was about 6 ft., and I caused a cross-cut to be made south towards the footwall. It was driven 5½ feet in full quartz, with no indication of the wall being reached, when I stopped the work in that direction. With the exception of the quartz taken from the shaft in the east shoot, the mill is now running upon ore taken from above the third or drain level, where it had been passed over by parties who had done nothing but to break up the quartz into small pieces, and to take some of this ore taken from above this level, quite as good results may be looked for as from the quartz taken from the shaft, being sunk beneath the third and fourth levels. This large body of quartz above the drain level, from its position could, in my estimation, be mined and milled at a cost not to exceed \$3 per ton. There is quartz sufficient to keep the mill of 24 stamps employed for (say) three years.

HOISTING WORKS.—The hoisting works are situated in the mine on the third or drain level, and are two in number, located at the middle and east shoots. The works on the shoot consist of one wheel, 12 feet in diameter, 2½ ft. face, and with a head or pulley of 20 feet in diameter, and three 2 in. cables, 2 in. broad, with safety-cage, upon which cars are placed and loaded at bottom of the shaft, hoisted to third level, when the quartz is delivered to the battery without further handling. In the east shoot the hoisting works are located the same as at the middle shoot, and of the same power, with a self-acting skip for taking up the quartz and delivering it to the cars on this level. This power also runs a pump that keeps the shaft clear. Water is the power used on both these wheels. WATER AND PUMPS.—Below the third or drain level the mine has considerable water, principally from the seepage from the snows that are melting during the summer, and the water finding its way down through seams of the lode, to the lode. To keep the mine free there is a pump with 6 feet stroke and 9 in. plunger. This pump is driven by a water-wheel 32 feet in diameter, 3½ feet breast, and the power is sufficient to drive this as well as another pump of equal size, should it ever be needed. There are, in addition to the pumps now in use, two 8 in. and one 5 in. Cornish pumps, on hand and in order.

MILLS.—The mill is situated, as shown on the maps and drawings accompanying this report, at or near the entrance of the tunnel that cuts the third or drain level, and consists of six batteries, each having six stamps to each battery, with a weight to each stamp of 700 lbs. The stamps make 65 drops per minute, and fall from 9 to 12 in., with a crushing capacity of near 2 tons of quartz to each stamp, or 40 tons per day. There is in the mill one of Hendy's concentrators, through which the tailings pass; also, one small pan, in use for grinding sulphurets. (This pan is an experiment so far, and has returned about \$100 per week from the sulphurets worked in it.) The company have ordered a Knox pan 4 ft. 6 in. in diameter, that is now on the way to the mine, for the purpose of working sulphurets, now for the first time being saved. For the same reason, which are made a part of this report, and numbered one, two, and three, the amalgamation is by quicksilver in the batteries. Copper plates and blankets are used to collect and save gold that is not taken up in the batteries. The tailings are worked over by the use of "arrastras," run or controlled by parties not connected with the mine, who pay for the use of them the sum of \$40 per month for each arrastra, as rent. There are but two now in operation. The machinery of the mill is driven by two water-wheels of 32½ feet in diameter, 4 ft. breast, and placed one above the other, and is so geared as to give the same power as a wheel of the same breast, and it is 65 feet in diameter, and it is estimated that it would drive 16 additional stamps if necessary. The present mill went into operation in the fall of 1869, and has been in operation most of the time up to date.

WATER PRIVILEGE.—The power used for driving the machinery on the Independence Mine is water, which is taken from the following lakes:—Upper and Lower Sardine lakes, Packer's lake, and Upper and Lower Salmon lakes, distant by flume from the mine about 7 miles. The right to take the water from these lakes is owned jointly by the Sierra Buttes Mining Company and the Independence Mining Company, and the right has been and is recognised by the authorities in the mining district of Downville, and is properly recorded. The water is taken by flume and ditch to the mills of these two companies, and is now driving 72 stamps at the Sierra Buttes Mine, and 24 at the Independence. There is an arrangement between these two companies by which the Independence, which is at an elevation of 100 feet above the Sierra Buttes, can have all the water first and then return it by a flume (already built) to the Sierra Buttes, thus doubling the power of each, as the water is now divided, each mine using but one-half part. The supply of water to these lakes is from natural springs and the melting of snow, and it must be perpetual, as under the conditions of the lakes above mentioned the snow never disappears. The altitude of these lakes, as fixed by the Geological Survey of California, is 7700 feet above sea level.

TIMBER FOR THE MINE.—There is within 1 mile of the mine, pine, spruce, and other timber in abundance, that is now reached by a trail. The timber used for the mine is hauled along on the ground by mules for the greater portion of the distance. All this could be avoided by the building of a wagon-road of 1¼ mile in length, on a grade not to exceed 10 feet in the 100. The survey of said road has been already made, and it is perfectly practicable and would cost about \$2500. This would lessen the expenses of the mine materially. In this forest there is a large proportion of excellent saw timber, and by the additional cost of a circular saw and the necessary machinery, all the lumber now used in and about the mine and buildings could be manufactured at a cost not to exceed \$10 per 1000 feet. The lumber used now costs \$40 per 1000, delivered at the mines. The timber is so situated that it is or would be under the entire control of the owners of the Independence Mine, particularly if the wagon-road above spoken of should be built.

QUANTITIES OF QUARTZ MINED.—From the year 1858 up to the present time the following amounts were taken from this mine, as shown by the books of parties who purchased the bullion:—1858, \$35,558.40; 1859, \$36,752.77; 1860, \$47,575.92; 1861, \$19,862.29; 1862, \$127,830.99; 1863, \$44,556.39; 1864, find no returns for this year; 1865, \$10,789.00; 1866, \$63,288.12; 1867, \$97,805.93; 1868, \$91,912.83; 1869, \$38,316.35; 1870, \$71,853.44; 1871 (three months), \$15,097.39; yield of the arrastras (estimated five years), \$30,000.00—this would make the yield of the mine since 1858 up to the present time, as far as can be ascertained, \$751,563.62. The cost of mining and milling the quartz is impossible to estimate, as the parties who have owned and worked the mine seemed to keep no exact record as to the quantity of quartz crushed or the cost of mining or working the same. The amounts stated were taken from the books of bankers and buyers of gold dust in the city of Downville, who handled this amount, less the estimate of \$30,000 from the arrastras, as the yield of this mine; but as to how much bullion has been disposed of otherwise there are no means of ascertaining. I account for the difference in the yield of bullion in the different years from the mine in this way:—When a large run was made, little more work was done than the amount was exhausted; and at other times by accidents to the machinery, which in earlier years was quite imperfect. During the year 1863 the mill of 24 stamps was carried away, and one of the proprietors killed; this threw the business into the courts, and delayed the working for a long time.

IMPROVEMENTS.—I beg leave to refer to the sketch and maps that form a part of this report, which show quarters for men, shops, stables, offices, &c., sufficient to carry on the business of the company, or even double the force at present employed. There are at present on the pay-roll of the company 50 men, all told, at monthly wages that will average \$50 per month. This does not include the living of each man, which will cost about \$18 per month additional. This is a great reduction in the price of labour as compared to a few years ago, when wages were at \$4 per day or over. There is on hand castings, powder, fuse, flour, iron, tools, quicksilver, &c., sufficient to keep the present establishment running for six months longer. In the way of improvements there is also shown on the maps the practicability of driving two tunnels to cut the lode at lower points than the deepest working of the mine at present. The first, or what is called on the map "Said Station,"—a tunnel of 2126 feet in length—would if run at right angles to the lode cut it 740 feet below the third or drain level. The second, or what is called "Manuel Station," in a length of 2880 ft., would tap the lode at 910 ft. below the third or drain level. These tunnels can be driven 7 ft. high by 5 ft. wide on the bottom from \$6 to \$8 per foot by contract. Should either of these improvements be made the cost of hoisting the ore and pumping (both of which items enter largely into the expense of mining) would be dispensed with, and a corresponding reduction would be made in the working expenses of the mine.

CHARACTER OF THE ORE.—The quartz in the Independence resembles that of the Sierra Buttes Mine in many particulars, that in the upper levels being decomposed and quite soft, and carrying free gold with but few sulphurets, down to the second or 200 ft. level, and the gold is frequently met in close connection with iron pyrites. In the third, fourth, and fifth levels the sulphurets are more abundant, the lode, however, showing free gold in many places in these levels. The assays, which are hereby made a portion of this report, were made from quartz taken from the lode on the fifth, fourth, third, and second levels, and are numbered two, four, five, and six. That numbered five was made from what appeared to be case rock, and the result of the assay proves that view to be correct. The assays of samples of sulphurets, hereby submitted, and numbered one, two, and three, were made from about 10 lbs. in quantity, and show the mine to be rich in that particular. Not until recently has any attention been paid to the saving of these rich sulphurets, as there was no provision made in the mill for grinding them. Judging from the assays made from those already saved, and the increased quantity of sulphurets at greater depths are reached, I believe that a great portion of the wealth of this mine will be found in that direction.

GENERAL REMARKS.—The Independence Mine, from its location at an elevation above the valley of the Yuba river, can be drained and worked through tunnels to a depth of 2000 ft. below the present workings, the longest of which would not exceed 6000 ft., and with the mill located at that point, and the present supply of water, with a head of (as it would be) 2000 feet, would drive

almost any amount of machinery. This immense power for driving machinery and a body of quartz for the full length of the lode, 5000 ft. and 2000 ft. perpendicular, timber for the mine as well as for lumber in an unlimited quantity, all under the control of the mine owners, the large size and apparent permanency of the lode, small cost of mining and milling the ore, with easy communication by wagon road or rail to San Francisco or New York, all have a tendency to make this property desirable as an investment.

San Francisco, June 6. HARRY LINDEN, Mining Expert.
The above report adopted and approved by order of the board of directors of Bureau of Mines and Mining Statistics of Pacific States.
J. BERTON (Vice-Consul of France), President.
E. P. HUTCHINS, Secretary.

This is to certify that upon the request of Col. J. Berton, President of the Mining Bureau, and under the direction of the board of directors of said Bureau, I have made a contra-examination of the Independence Mine, Sierra County, California, and have read the report on the same made by Col. Harry Linden, duly appointed under the direction of the Board, and I fully concur in all the facts set forth concerning the Independence Mine. E. DERBEC.
San Francisco, June 7, 1871. Practical Metallurgist and Mining Expert.

[The various assays of ore were made from samples taken from the different levels, and the sulphurets from a quantity of over 2000 lbs., and the results of the assays are upon the basis of 2000 lbs. to the ton of ore.]

OUR MINES IN LONDON.—The London Times having cautioned capitalists against rash investments in certain Pacific coast mining enterprises (having in mind doubtless the disastrous Pyramid Silver Mine), Mr. J. Ross Browne writes a letter to the City editor, defending the mines of this coast in general terms. He alleges that out of \$1,400,000,000 taken out of the mines of the Pacific States and Territories since 1848, Great Britain has received not less than \$900,000,000 a year. He contends that Great Britain ought, therefore, to foster Pacific Slope mining enterprises, and he affirms that the reports of British capitalists having lost money by investment in these mines are in the main unfounded. He intimates that an "illogical" prejudice has arisen in the London money market against Pacific Slope mines, and deprecates such a feeling. The Times takes exception to most of his assertions. It denies that Great Britain has derived any such benefit as he states from these mines; reminds him that "trade and finance have no prejudices," and says that "if any scheme, either in California or any other part of the world, offering a fair chance of profit, be presented to us, it will be caught up with too much, rather than with too little, avidity." It says further—"between buyers and sellers sensitiveness to criticism is on either side an idle feature, and any attempt to meet objections to a Californian mining scheme by attributing them to a general prejudice against California would be as vain as if a French glove-maker whose goods were deemed unsuitable should try to overcome the difficulty by attributing it to hostility to France." It appears to us that this is the common sense view of the matter, and that Mr. Browne has suffered his patriotism and his zeal for his employers to run away with his judgment. It is mere nonsense to assume that capital can be diverted from eligible investments by a sentimental prejudice, or that any opinion a man might hold in regard to a certain country would prevent him from investing in that region, if the security were good and the returns ample. This question of British capital and Pacific coast mines is purely and simply a business question. That it is so has recently been demonstrated by the successful negotiation of a very valuable California mine through an agency which afforded the needed guarantees of genuineness and good faith. No arguments having reference to the presumed or assumed benefits which one country may have derived from the resources of another can have any practical bearing upon this question. If British capitalists have heretofore been reluctant to invest in our mines, and have alleged as a reason that they had been cheated by adventurers in the past, the presumption is that they spoke the truth, since they certainly could have had no object in manufacturing excuses for refraining from entering upon profitable undertakings. Capital is stupid, but it is not stupid, and we have a right to conclude that the sole cause of the reluctance to invest in our mines hitherto has been the absence of those guarantees which good business men demand as a matter of course. Abusing the Times, and harping upon assumed "illogical" prejudices, will not we feel assured produce any beneficial results. As we have often said before, the question is a simple one and easily settled. All that is necessary to restore confidence abroad in our mines is to take care that none but bona fide concerns are placed on the foreign market, or at least to afford foreign capitalists a sure means of discriminating between good and bad, by stamping the former with an official mark of approval which will be denied to the latter. This method has already been inaugurated successfully, and the results of the experiment thus far have been all that could be desired. When a few more of our valuable mines have found purchasers through the same agency, we are confident that capital will flow steadily in upon us through this channel, and that we shall cease to hear complaints and suspicions which it is only justice to say, are for the most part based upon proceedings which 19-20ths of our people regard with the strongest disapprobation.—*Sacramento Daily Record*, July 11.

FOREIGN MINING AND METALLURGY.

The state of the iron trade in the Champagne (France) district has improved as regards some descriptions, but no change for the better is observable as regards other qualities. Until railway goods and mineral traffic is fully resumed there can be no really serious revival in affairs. Every day hopes are held out that the trucks detained in Germany will be returned, but at present the number sent back does not exceed 300. Puddled charcoal-made iron is quoted by continuation at 107, 12s, to 117, per ton, according to the works; iron from coke-made pig is held less firmly, and brings from 97, 4s, to 97, 12s, per ton. Mixed machine iron, No. 20, is currently dealt in at 107, 16s, per ton, coke-made being 107, per ton. In the Moselle and the Meuse it is not very easy to establish a quotation for pig. Affairs have not regained their full current, and stocks are disposed of with difficulty. White pig has made 27, 18s, 4d, to 37, per ton, and speckled or grey refining pig 37, 1s, 8d, to 37, 4s, per ton. The Marquise Blast-Furnaces and Foundries Company has obtained a contract for pipes required in connection with the water supply of Bayonne.

The Belgian iron trade has not experienced much change. Orders for pig, merchants' iron, and plates continue abundant, and prices are firmly maintained. Official returns which have just appeared show that in April Belgium imported minerals and limailles to the extent of 51,096 tons, against 55,135 tons in April, 1870; in the first four months of this year the imports were 182,489 tons, against 202,794 tons in the corresponding period of 1870. The imports of pig and old iron into Belgium in April amounted to 4901 tons, against 10,371 tons in April, 1870; in the first four months of this year the imports were 19,878 tons, against 31,177 tons in the first four months of 1870. The imports of pig and old iron into Belgium have, thus, considerably declined this year; the subsequent months of the year will probably, however, to some extent make good the falling off, pig having of late come to hand from England in much more important quantities. The imports into Belgium of wire, rails, plates, and other descriptions of iron present no remarkable feature. The whole imports of iron, exclusive of minerals and limailles, amounted in April to 5462 tons, against 11,093 tons in April, 1870; and in the first four months of this year to 21,617 tons, against 34,517 tons in the corresponding period of 1870. The exports of minerals and limailles from Belgium in April attained a total of 17,531 tons, against 15,358 tons in April, 1870; in the first four months of this year the exports amounted to 42,135 tons, against 54,070 tons in the corresponding period of 1870. The exports of rough pig and old iron from Belgium amounted in April to 3096 tons, against 628 tons in April, 1870; and in the first four months of this year to 8950 tons, against 2101 tons in the corresponding period of 1870. The exports of rails from Belgium in April remained much below those of April, 1870, the total being 7480 tons, against 12,229 tons. In the first four months of this year the aggregate exports of rails from Belgium amounted to 15,891 tons, against 34,823 tons in the corresponding period of 1870. The exports of plates from Belgium this year also show a decrease, having been 1111 tons, against 2322 tons in April, 1870; in the first four months of this year the exports were 4510 tons, against 7383 tons in the corresponding period of 1870. Upon the whole, the exports of iron of every description from Belgium, excluding minerals and limailles, amounted in April to 20,093 tons, against 26,012 tons in April, 1870; in the first four months of this year the aggregate exports were 56,960 tons, against 77,560 tons in the corresponding period of 1870, showing a decline of 20,600 tons. The Seraing Company has obtained a contract for 3500 tons of rails for the Northern Brabant Railway (Boxtel and Wesel). The works of this line, which will compete with the State network for direct traffic from Antwerp to Bremen, Hamburg, and Cologne, are being pushed forward with activity. M. Enschede, a Liege engineer, has the direction of the working operations.

The French coal trade has remained comparatively quiet. Industrialists seem disposed to go on from day to day in a hand to mouth fashion rather than to give out important contracts. There is an undeniable dullness in affairs at present, and confidence must revive before a serious animation can be imparted to the French coal trade. Prices have, nevertheless, been supported with firmness, and French coalowners do not feel disposed to make concessions; on the contrary, they regard the future with calmness, and some of them are actively prosecuting the extraction of coal, while others are devoting themselves to preparatory works.

There is nothing very novel to report in the state of the Belgian coal trade. Orders are arriving, however, rather more freely than hitherto, especially from France; but railway rolling stock continues to make default, and boats on the canals are also not so abundant

as could be desired, notwithstanding the rise in freights. Coke has been in considerable demand. Official returns show that Belgium imported in April 18,675 tons of coal, against 23,683 tons in April, 1870. In the first four months of this year the aggregate imports of coal into Belgium amounted to 59,782 tons, against 74,415 tons in April, 1870. The imports of coke into Belgium in April were 187 tons, against 701 tons in April, 1870; in the first four months of this year the coke imports were 628 tons, against 3157 tons in the corresponding period of 1870. The exports of coal from Belgium in April amounted to 238,742 tons, against 302,781 tons in April, 1870; in the first four months of the year the aggregate coal exports from Belgium were 775,952 tons, against 1,188,965 tons in the corresponding period of 1870. The exports of coal to the Zollverein and the Low Countries have considerably increased this year, but the exports to France show a falling off of more than 500,000 tons. There is nothing surprising, however, in this adverse result, having regard to all the surrounding circumstances. The exports of coal from Belgium in April were 30,696 tons, against 59,150 tons in April, 1870; and in the first four months of this year 115,324 tons, against 238,194 tons in the corresponding period of 1870.

At Havre, Chilean copper, in bars, has made 717, to 727, per ton; refined ditto, in ingots, 777, to 807; and pure Peruvian minerals, 717, to 727, per ton. American descriptions continue to make default. At Marseilles, Spanish copper has brought 727; refined Chilean and Peruvian, 767; rolled red copper, in sheets, 807; and ditto, in rounds, 847, per ton. In Germany the position of the article is satisfactory: orders for consumption follow each other regularly, and seem to be acquiring more importance; prices have displayed an upward tendency. At Marseilles, Banca tin has been quoted at 1487, and English at 1527, per ton. The article has been well supported upon the German markets. There is little or no change to note in the tone of tin at Rotterdam; Banca has made 807 1/2, and Billiton 797 1/2. There is little or no change to report in lead upon the French, German, or Dutch markets. Zinc has been rather neglected.

FOREIGN MINES.

ST. JOHN DEL REY.—The directors have received per Gironde the following report, dated Morro Velho, June 29:—Morro Velho produce, second division of June, 11 days, 3284 osts.—July 1: Yield, 2,240 osts. per ton.—New shafts sinking: A shaft has been sunk 2 fms. 2 ft. 4 in.; B shaft, 4 fms. 0 ft. 4 in.; total, 6 fms. 2 ft. 8 in. The rock in the sum of A shaft has been exceedingly hard: no dynamite during the last week of the month. The Gironde has been opened to the extent of 1 ft. westward and 10 ft. high. Next month we shall have space for more borers. The mineral appears to be of the same quality as at the upper levels; we shall stamp some of the mineral this month.

DON PEDRO.—F. S. Symons, June 30: Produce: Weighed to date, 10,688 osts.; estimate for the month, 12,468 osts. Operations are carried on with regularity, and lodes generally yielded well. Box work has been taken from the canoa and curve, and also, I am pleased to report, from a line touched in sinking to gain the footwall of No. 6 shoot near the old sump-shaft. Good strake work continues to be taken from the eastern extremity of the lode at Alice's west below level. The plat has been completed at the entrance to the 25 fm. level cross-cut. We find the ground does not drain well, and are pushing on with the cross-cut north from the 25 fm. level cross-cut, so as to more effectually drain the canoa and curve. Works at the adit level are progressing as well as those at the other sections. Nothing new at the explorations.

ANGLO-BRAZILIAN.—F. S. Symons, June 29: Passage: The sick list is favourable, and works on the Fundao lodes and cross-course carried on with regularity. Samples from the latter are favourable, but from the former not what the appearance of stone would lead us to expect. Force is concentrated on the lode where Vieira should pass, and exploring on the same. Force has been reduced, and many hands, including one English miner, drafted to Pitangue. Works are progressing, and adequate force arranged. At Hoskin's level the ground is favourable. The adit level was commenced on July 2, and will be driven in direction of the Ouro Preto line, and to have been left rich; the length of same will be 116 fms., and according to survey should give about 35 fms. of backs. Materials have been and will continue to be forwarded from Passage. The erection of a 12-head stamps will be pushed on with as quickly as possible, as well as other machinery.

GENERAL BRAZILIAN.—T. Treloar, June 28: The works generally continue to advance satisfactorily, but nothing has occurred calling for remark by this opportunity except at the shallow adit at Itabira. At the latter place a vein of jacting has been intersected, but it seems too far south to be part of the main lode; its width is about 3 ft., its appearance highly promising, and it is auriferous. We shall open on it, but the necessity for hastening on shallow adit to Moore's shaft will prevent any great exploration at present. A Feltor, San Francisco de Souza Pereira, who has had great experience in the Itabira mines, says the vein struck will give gold—that it is entire to the surface, and that he always told the former proprietors they would do wrong if they sold these mines. It may be well to mention that the postman who left here on the 16th inst. broke down on the road, and that our despatches, which should have left Ouro Preto on the 18th, did not leave that city till the 20th; owing to this I fear they reached Rio too late for the Southampton packet.

ROSSA GRANDE.—E. Hilleke, June 28: The work at the different sections has been carried on satisfactorily. At Batu Mine we have hitherto dug to sump-shaft, and the works connected with the pumping machinery are progressing well. We have commenced stoping on the lode at the Cachoeira Mine, intersected by the adit level, and a few days since the stamps have been supplied with stone from this place, but as yet no correct estimate regarding its value can be made. At Caco lode and Mina du Serra there is nothing new.

TACUAREL (Gold).—Mr. T. S. Treloar (June 28) reports:—Operations generally: The mineral which was being raised for the stamps showing no indication of improvement, stoping for produce in line of shoots has been suspended, and the force devoted to prosecution of explorations. The levels are in course of driving east and west at various points on both lodes, and all the stuff thus derived is carefully treated. Encouraging samples have occasionally been obtained from the bottom of Hayes' shaft, but the quantity is small, and judging from the appearance of the sand at the wash-house the produce will not, I fear, manifest any material improvement upon that of last month.

PACIFIC.—Telegram received on Thursday.—Amount required for last month's pay \$4000; 400 ft. level looking rich—1 ton per day, worth \$300.

SWEETLAND CREEK (Gold).—Telegram from the Superintendent:—We have cleaned up after a run of 35 days. The gross returns are \$15,250; the profit is \$9000. I send you a remittance of \$9000.

SATURN (Silver).—Telegram from Utah: Have struck the vein in the tunnel all right.—[This refers to the tunnel mentioned in Capt. Tiddell's report, as striking the lode 120 ft. below the surface.]

UNITED MEXICAN.—Extracts of dispatch from Mr. Edward Hay, dated Guanajuato, June 21:—Mine of Jesus Maria y Jose: In the frente of Santa Inés a small strip of good ore has been met with, and although the quantity is limited its ley has served to bring up the value of the carga extracted from the deepest workings. The other workings continue poor. The excess of outlay for the month of May was \$3410. Mine of Remedios: The frente of Santa Inés has improved a little, and hopes are entertained that to the north of the workings we may meet with the same rich ore we reached in San Gregorio below. This improvement assists to bring up the ley of the carga. The profit for the quarter ending May 27 was \$3825, of which \$2231 was the company's share.—Adit of San Cayetano and Mine of Buenos Ayres: In the month of May 705 varas were driven further westward, without any change in the general look of the rock. Since then, in the last fortnight, we have come on a network of quartz and other rock, but without any wall, and which, though hard, bears well. Mr. Furber, before leaving, marked the spot where a cross-cut was to be driven south towards the vein, and the rubbish that had accumulated in the adit could be carted out. This work has been going on gradually, to enable us to push on the frente, and has advanced so far that in about eight or ten days we shall be able to begin the cross-cut.—Mine of San Antonio de la Ovejera: The cross-cut advanced in the month of May 715 metres. In the three weeks ending June 17 the same work was advanced 53 metres, which brings the works to a distance of 814 metres from the shaft. The only change in the rock is that it is better adapted for blasting purposes.—Mine of San Cayetano de la Ovejera: In this mine some business has been done at work on a narrow strip of ore they discovered on the surface. The produce of their labours is divided in equal parts between them and the company. Some three or four cargas have already been gathered together for the company's share, and as the work is still going on we shall know the result at the end of the month. It assays on an average about 14 marcs of silver per monoton, or about 77 ozs. per ton; still, no great faith can be put in the sampling of very small quantities of ore of different leys.

ECLIPSE (Gold).—Mr. Henry Trellagias, July 6, says:—Let me assure you that we are pushing on our work as fast as possible. I hope by the time this reaches you we will be crushing quartz, then matters will be different. The quartz crushed by the atmospheric mill was from a heap that laid here for six years, and I think will yield about \$15 per ton; the tallings assayed \$18 per ton. I send the bullion to our agents for refining, after which they will tell you the value of same.

ANGLO-ARGENTINE.—Capt. J. Vivian reports for May:—We have in stock more than a year's supply of fuel for the engine; the contractor delivers on an average from 180 to 200 tons monthly, and our consumption at engine is about 40 tons per month. All this fuel is of first-class quality for firing steam, and is derived from within a distance of 8 miles from the company's works. Same delivered 12s. per ton. As regards the prospects of the mine, I can only reiterate my former statements. Let us get up the machinery, and I have no fear of the result. We have now thousands of tons of ore ready for the stamps. The various points of operation are being prosecuted vigorously.

ANGLO-ITALIAN.—Mr. Wahl, July 20: In Antrona Mine, at Cavetta, the mineral continues fine in quality, while it has increased in quantity, and I shall have to put on more hands in order to push on supplies. This mine is at present yielding from 1 1/2 to 2 tons of ore per diem, varying from 10 dwts. to 2 lbs. per ton. We have succeeded in raising this hitherto refractory ore, and I do not doubt but that this mine will soon prove most valuable. The Government engineer, who has been sent to inspect our mines and works, and to verify the boundaries of our concession ground, has expressed himself much pleased with all he saw, and told me that we may expect to receive the royal decree of concession within a few weeks. I may safely add that the prospects of this enterprise have materially improved, and that we may now look to a brighter future. The junction of the Font lode, the close proximity to lode Frederico, the hourly expected junction of Frian No. 1 mine, the improved treatment of the Frian and Cavetta ores, all tend to ensure ultimate success, and to speak the graphite, for which article I have reason to entertain excellent hopes, of

which I shall fully speak as soon as my present endeavours to render our graphite a marketable article, and known in the markets, have met with the result which I expect.

IMPERIAL OTTOMAN.—J. B. Champion, Peldidi, July 22: We have cut into a cross-course crossing the lode at the bottom level, composed of fluorite, the width I cannot positively say, but think it is only 6 in., which we find, and is apparently the other side lead and blende. In a few days I shall be able to write more particulars. The air is bad, and I have put the shaftmen to work and divide the shaft to the bottom of the mine, which will give good ventilation, so that there will be sufficient air to enable us to prosecute the underground works vigorously. There is nothing particular to remark in any other part.

BATTLE MOUNTAIN.—Capt. Richards, July 13: Virgin: In the scopes in back of the 113, south of Roach's winze, the lode is ore, but not rich. The lode in the north scope is containing ore of low quality. In July's mine in the back of the 73 ft. level north, good stones of ore are met with occasionally. The rise is up 25 ft., and the men can be heard working from the 37; as soon as communication is effected the 73 will be resumed, in which there is a promising lode. In the 73 north the lode produces occasional good stones of ore, the remaining portion being a copper-stained rock of no value, but looks as if we may expect more ore ahead.

PESTARENA UNITED (Gold).—Signor Franzl, Pallanza, Aug. 3: Return of gold for the month of July 541 ozs., from 737 tons of ore.

LUSITANIAN.—Palhal Mine: The lode has not been taken for the last fortnight. In sinking Taylor's engine-shaft below the 140 when last reported it was worth 4 tons per fathom. The lode in River shaft, sinking below the 110, is composed of quartz. In the rise above the 120, towards River shaft, the lode is composed of quartz and small stones of ore. The lode is 4 ft. wide in the 140, driving east of Taylor's, and worth 1/2 ton per fathom; it is 2 ft. wide, and driving 1 ton per fathom in the western end of the level. In the 120, east of Taylor's, the lode is 6 ft. wide, and composed of quartz and stones of ore; in the western end of this level the lode is 1 ft. wide, and poor; it is thought to be near the alide. In the 120, east of Taylor's, the lode is 6 ft. wide, and composed of quartz and spotted with ore. The lode is 1 ft. wide, and productive in the 110, east of River shaft. In the 90, east of River shaft, the lode is 4 ft. wide, composed of country, quartz, and stones of ore. The lode is composed of quartz and decomposed gneiss in the 70, east of River shaft; it is 7 ft. wide; in the quartz there is a branch spotted with lead, but of no value. In the adit level, west of Perez's shaft, the lode is 3 in. wide, containing a lead of ore 1 in. wide. The lode in the 138, east of Taylor's, is 1 1/2 ft. wide, composed of quartz and country. No. 88 winze, below the 128, is holed to the 140; the men are removed; the lode is small in No. 88 winze, sinking below the 28, but yields stones of ore.—Carvalho Mine: In the 60 fm. level cross-cut, north of incline shaft, the ground is a hard, tough gneiss. The lode in the 60, east of incline shaft, is 1 ft. wide, composed of quartz; the lode is 1 1/2 ft. wide, composed of quartz and spots of lead in the 60, east of incline shaft. In the 40, east of incline shaft, the lode is 2 ft. wide, composed of quartz and country; in the western end of the same level it is half that width, quartz, and stones of lead. It is 3 ft. wide in the 2, east of incline shaft, composed of quartz, containing stones of lead. In the adit level, west of incline shaft, the lode is 1 1/2 ft. wide, and productive 1 ton per fathom for lead and blende together. The lode is 2 ft. wide in the 10, west of incline shaft, composed of quartz and mundie, with spots of lead. In the 20, west of incline shaft, the lode is 2 1/2 ft. wide, composed of quartz and mundie, with lead and blende, worth 1/2 ton per fathom. In the 30, west of the incline shaft, the lode is 2 ft. wide, composed of quartz and spots of lead. The lode in the deep adit, west of River Calma, is 1 ft. wide, composed of quartz and mundie.

WEST CANADA.—Wellington: At Rowe's shaft, sinking under the 40 fm. level, the lode is large and sparry, and will yield for the length of about 2 tons of ore per fathom. The stone in the 50, east of Rowe's shaft, is of low quality, and will yield at present 2 1/2 tons of ore per fathom. The stone in the 60, east of Rowe's shaft, is without change, and will yield at present 2 1/2 tons of ore per fathom.—Huron Copper Bay: In the 60 fathom level, driving west of Palmer's shaft, the end is unproductive, and of an unkindly nature. In the 60 fm. level, driving east of Bray's shaft, the end continues to look well; the lode will yield 2 1/2 tons of ore per fathom. In the 50 fm. level, west of Palmer's shaft, the lode is looking more promising, and is worth at present about 1 ton of ore per fathom. In the 35 fm. level, west of Bray's, on Fire lode, the stone, which is near the point of junction with the main lode, will yield 1 1/2 tons of ore per fathom. The stone in the 50 fathom level, west of Palmer's shaft, will yield 2 tons of ore per fathom. The stone in the bottom of the 35 fm. level, west of Palmer's shaft, will yield 3 tons of ore per fathom. The stone in the back of the 35 fm. level, west of Palmer's shaft, will yield 2 1/2 tons of ore per fathom. The stone in the bottom of the 35 fm. level, east of Bray's shaft, will yield 2 1/2 tons of ore per fathom. The stone in the bottom of the 35 fm. level, east of Bray's shaft, will yield 2 1/2 tons of ore per fathom.

[For remainder of Foreign Mines see to-day's Journal.]

VAN MINING COMPANY—MONTHLY REPORT.

Aug. 2.—The following is my monthly report upon this mine, and the section list for the ensuing two months:—Seaham shaft is sunk 40 fathoms from surface, and communicated with the 15 fm. level cross-cut. A winze has been sunk in a perpendicular line with this shaft to a depth of 16 fms. 1 ft. 6 in. below the 15. We have this month set 13 men to strip down the said winze to the full size of the shaft, and timber the same, for the sum of 1807. The 45, west of the cross-cut, is driven 21 fathoms; the part of the lode here carried will yield on an average 10 tons of lead ore per cubic fathom. The 45, east of the cross-cut, is driven 11 fathoms; the part of the lode upon which this level is driven will yield 5 tons per cubic fathom, set to six men, at 240s. per fathom. We have 9 fathoms more to drive before we communicate with the winze sinking below the 30 fm. level, 20 fathoms east of engine-shaft; in the bottom of this winze we left a very rich lode. The winze is now suspended, as it is deep enough for the 45 fm. level. The stripping down of the lode to full width in the side of the 45, west of the cross-cut, is set to six men, at 85s. per fathom; the lode here will yield 85 cwts. of lead ore per cubic fathom. The stripping down of the lode to full width east of the same cross-cut is set to six men, at 80s. per fathom; the lode is worth here 4 tons of lead ore per cubic fathom. The average width at both of these places is 24 ft. The cross-cut south of Seaham's shaft, from the bottom of the 45 fathom winze, is driven 6 fathoms; set to six men, at 160s. per fathom. The 30, west of engine-shaft, is set to six men, to drive by the side of the lode, at 100s. per fathom; set to six men, to strip down the lode to full width at a point 80 fathoms west of the engine-shaft, in the side of the 30, at 100s. per fathom. The lode at this point is 15 ft. wide, and will yield 3 tons of lead ore per cubic fathom. The 15, west of the cross-cut, is set to four men, at 67s. 6d. per fathom. The 70 fathom cross-cut, in the side of the 30, west of shaft, at 110s. per fathom; the lode is 30 ft. wide, and is worth on an average 3 1/2 tons of lead ore per cubic fathom. Set to eight men to strip down the lode to full width, west of the 54 fathom cross-cut, in the same level, at 100s. per fathom; average width of the lode 3 fathoms, which will produce 2 1/2 tons of lead ore per cubic fathom. The 54 fathom stoep, in the back of the 30, west of engine-shaft, is set to eight men, at 100s. per fathom. The 45 fm. stoep, in the back of the same level, west of engine-shaft, is set to eight men, at 100s. per fathom. These two stoeps will yield on an average 4 tons of lead ore per cubic fathom. The level driving east of the 44 fathom cross-cut, in the side of the 30, on the north part of the lode, is set to six men, at 240s. per fathom, worth 3 tons of lead ore per cubic fathom. The 30 fathom stoep, in the back of the 30, west of engine-shaft, is set to eight men, at 70s. per fathom. The 24 fathom stoep, ditto, to eight men, at 70s. per fathom. The 16 fathom stoep is set to six men, at 67s. 6d. per fathom. The 8 fathom stoep is set to six men, at 70s. per fathom. The average width of these four stoeps is 28 feet, and 3 tons of lead ore per cubic fathom. The 5 fathom stoep, in the back of the same level, east of engine-shaft, is set to four men, at 65s. per fathom. The 16 fm. stoep is set to four men, at 67s. 6d. per fathom. The 24 fathom stoep is set to eight men, at 70s. per fathom; the average width of the lode here is 24 ft., worth 45 cwts. of lead ore per cubic fathom. The 15 is set to nine men, to sink a winze by the side of the lode, at a point about 98 fathoms west of the engine-shaft, in the bottom of this level, 12 fathoms east, at 160s. per fathom, in order to ventilate the 30, and afford a passage for stuff to fill up the stoep in the back of the 30 when necessary. The 74 fathom stoep, in the back of the 30, west of engine-shaft, is set to six men, at 65s. per fathom. The 64 fathom stoep, in the back of the 30, west of engine-shaft, is set to eight men, at 65s. per fathom. The 54 fathom stoep is set to eight men, at 70s. per fathom. The 44 fathom stoep is set to six men, at 67s. 6d. These stoeps will produce on an average 55 cwts. of lead ore per cubic fathom, worth 4 fathoms. The 16 fathom stoep, in the back of the same level, west of shaft, is set to four men, at 80s. per fathom. The 8 fathom stoep, in the back of the same level, is set to four men, at 80s. per fathom. The 8 fathom stoep, in the east of shaft, is set to six men, at 75s. per fathom. The 24 fathom stoep, in the back of the same level, east of shaft, is set to eight men, at 70s. per fathom. The lode in these four stoeps is on an average 2 ft. wide, and worth 30 cwts. of lead ore per cubic fathom. The 8 fathom stoep, on the north part or leading of the lode, is set to four men, at 65s. per fathom. The 16 fathom stoep, ditto, set to four men, at 67s. 6d. per fathom. These two stoeps will produce 25 cwts. of lead ore per cubic fathom, worth 12 ft. The 15, east of engine-shaft, is driving in the country rock; set to four men, at 110s. per fathom. The winze in the hanging of the lode, 45 fathoms east of the engine-shaft, in the side of the 15, is down 43 ft.; set to six men, 6 fathoms steep, at 140s. per fathom. This winze is being sunk for the purpose of ventilating the 30 when driven that far, and when required as a passage for stuff to fill up stoeps; we tried the lode at 4 fathoms deep, where it was worth fully 5 tons of lead ore per cubic fathom. You will please observe that at this point in the higher levels we made no discovery of lead; the soft forms a cap on the top of the productive ground. Further east, in the 15, we have just skinned the top of a run of ore greasy with little for winding and opening up this eastern ground, as I believe they shall have another splendid mine here. I should be glad to have the new cylinder for pumping-engine fixed, so as to be able to work the pumping gear at Edward's shaft, and sink this shaft to a greater depth. I may here remark that from all appearances our ore ground will lengthen considerably as we go deeper. The deep adit permanent level in the country rock is set to six men, at 110s. per fathom; set to six men, to put up a rise to surface at a point 110 fathoms east of engine-shaft, in deep adit, in order to ventilate and supply with part of the mine with plenty of stuff for filling up from a quartz, which shall open on the hill on the south side of the lode, at 140s. per fathom. I have also set to six men another rise for the same purpose, at a point 62 fathoms west of the shaft, in the back of the adit, at 100s. per fathom. We shall lay down a tramway from the top of this rise to the said quartz, and thereby be in a position to keep the western part of the mine very well supplied with stuff for filling; set to six men to drive a level about 12 fathoms long along the footwall of the lode in the adit, to communicate with the rise from the 64 fm. stoep, at 110s. per fathom.—Surface: We are making good progress with building the new bin for lead ore by the side of the branch railway, which, when completed, will be large enough to hold 1200 tons. We have fixed a second stone-breaker on the top floor, and have considerably lengthened out the side wall. The cottages for the pitman and millwright are completed. The enlarging of the reservoir is progressing satisfactorily. All the machinery is in good working order. Our sale for the last month will take place to-morrow. The quantities are 450 tons of lead and 100 tons of blende.—Capt. WILLIAMS.

London: Printed by RICHARD MIDDLETON, and published by HENRY ENGLAND (the proprietors), at their offices, 26, FLEET STREET, E.C., where all communications are requested to be addressed.—August 6, 1871.